Seattle Police Department

Proposed development of a Business Intelligence System

Proposed Future State Recommendations & Roadmap

Proposed Future State Recommendations

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Contents

Terms and Definitions

Abbreviation	Definition
BI	Business Intelligence
CAD	Computer Aided Dispatching
CI	Crisis Intervention
CoS	City of Seattle
DOJ	Department of Justice
PMS/EIS	Early Intervention System
ETL	Extract, Transform, Load
GO	General Offense
HR	Human Resources
IT	Information Technology
IP	Internet Protocol
KPI	Key Performance Indicator
LAPD	Los Angeles Police Department
LASD	Los Angeles Sheriff's Department
ODBC	Open Data Base Connectivity
OPA	Office of Professional Accountability
PARC	Police Assessment Resource Center
PMS	Performance Management System
QA	Quality Assurance
RMS	Record Management System
SQL	Structured Query Language
SPD	Seattle Police Department
SSO	Single Sign On
UOF	Use of Force

1. Executive Summary

1.1. Introduction

The United States and the City of Seattle have entered into a Settlement Agreement and Memorandum of Understanding with the Department of Justice with the goal of ensuring that police services are delivered to the people of Seattle in a manner that fully complies with the Constitution and laws of the United States, effectively ensures public and officer safety, and promotes public confidence in the Seattle Police Department and its officers. As part of the agreement, a Monitor was appointed by the federal court to assess compliance and report on the implementation of this agreement. A Monitoring Plan has been established which provides a schedule and a blueprint for compliance with the Settlement Agreement.

The Monitor has identified a number of deficiencies with the Seattle Police Department's (SPD) current business processes and systems that may hinder compliance with the Settlement Agreement. The agreement requires the Seattle Police Department to have a robust IT system that operationalizes core functions of the department, provides officer performance insights to managers which will allow them to actively supervise and monitor their officers, and to have a comprehensive reporting mechanism to evaluate and assess performance metrics and outcomes as an early intervention system. In order to comply with the requirements of the Settlement Agreement, the Monitor has asked SPD to develop a mature and comprehensive Solution that fulfills all these goals. This information will allow supervisors and officers to carry out their day-to-day operations, effectively manage their staff by identifying potential issues and problems that can then be corrected and prevented through training, supervision, coaching and mentoring, and provide needed training and mentoring to prevent potential problems. This system will also provide the department and the Monitor with greater visibility into SPD's performance data that will facilitate the assessment of compliance with the Agreements.

For the Seattle Police Department, information, communications and technology are pivotal areas in the transformation of Police operations. As SPD moves forward with improving accountability both internally and with the citizens of Seattle, the following have been identified as desired outcomes:

- Improved professionalism by building awareness and clarifying expectancies
- Provide uniform and consistent standards across the department
- Provide high quality training and the ability to assess its effectiveness
- Develop objective performance expectancies and strong mentoring dynamics with all levels of the organization.

As such, the Department seeks to ensure alignment of its business and IT systems, operations and processes with current and future needs of the solution desired by the Monitor to be in compliance and meet the goals outlined. To this end, SPD collaborated with an external consultant to review, assess, evaluate and make recommendations for a solution to meet its goals. The Project Team has carried out a Current State Assessment of SPD's existing IT systems, processes, technologies and operations to bring about the gaps and associated risks to determine readiness and maturity towards the desired Future State solution.

Note: The Current State assessment was carried out at a high level with the aim of highlighting major risks and gaps to deploy and support a solution. This should not be considered an IT audit as this was not in scope for this exercise.

1.2. Objectives

The objective of the Future State Recommendation & Roadmap document is to summarize the recommendations from Current State, Gap Analysis assessments as well as lay out the proposed end-state solution, a roadmap for deployment, and high-level budget figures that will summarize pre-requisites for the solution, resource costs as well as hardware and software costs.

1.3. Methodology

A Current State assessment was performed to examine SPD's readiness to deploy and support a Performance Management System/Early Intervention System as prescribed by the Settlement Agreement. This assessment examined at a high level the SPD's business processes, IT systems, people and capabilities as they relate to the end state Business Intelligence solution. Gaps and risks from this exercise were then documented in the Gaps Analysis document.

In the Future State Summary document, requirements were gathered from the Settlement Agreement, the Monitoring team, the SPD Compliance team, SPD IT and from business users within the Seattle Police Department. These requirements were consolidated and distilled in to functional and technical specifications for a BI solution, which were then summarized in to a solutions architecture template.

This document will provide a summary of the proposed Performance Management/Early Intervention System followed by a roadmap to implement the gap remedies and develop the solution for the SPD. A summary of the gaps and risks found from the Current State assessment and documented in the Gaps Analysis document will be summarized as well as recommendations for remediation and moving forward with the proposed BI solution.

Throughout this exercise, the Project Team gathered inputs from IT, various business teams supporting business processes as well as SPD Compliance.

1.4. Findings & Recommendations

1.4.1. Key Findings

The Current State assessment was performed to identify gaps that could pose possible barriers to the successful implementation of the BI solution. As a result of the Current State assessment, a number of key gaps were identified. The key gaps below are organized around Process, Technology and People:

- Process – a number of areas were found to have issues with processes such as:
    - Data Quality, Availability and Reliability – consistency and availability of data is a challenge in many areas as critical business processes were often manual, paper based systems, or some systems had incomplete or out of date data, or data could be spread across many different systems
    - Data Management and Data Governance – there is a lack of data management and governance practices and processes resulting in lack of data, inconsistent data, inaccurate data or the same data in different forms, as well as no noted processes to check and validate data.
    - Quality, Reliability of Data Capture and Reporting – key business processes such as Use of Force, OPA complaints, traffic collisions, pursuits and lawsuits are manual, paper based processes and as a result, reporting, tracking and auditing the data is extremely labor and time intensive operations with limited usefulness.
    - IT Governance Processes – while IT governance practices do exist, they were found to be based on spreadsheets and emails and there weak controls around separation between production and development environments.
- Technology - There is a general lack of technology encapsulating critical business processes and systems. Many critical business process such as Use of Force, OPA complaints, officer involved

collisions and pursuits as well as lawsuits have no electronic workflow and are paper-based, manual processes. As such, critical data essential for the BI solution is not readily available. While progress has been made on unifying applications under a common environment, there are still many systems for which there is little or no integration with key applications, resulting in application silos. There is also no unified reporting environment available; a number of reports are extracted from a variety of systems and then consolidated manually. Furthermore, there are a lack of systems in place to perform data checks to ensure reliability, availability and accuracy.

- People – there are a number of key roles missing from SPD IT which are critical to not only help close the gaps data management, governance and process, but to support the implementation of the BI solution, as well as support the solution on-going. Examples of these roles include Data Architects, Solution Architects, Portfolio Managers and Business Analysts

1.4.2. Recommendations

Based on the key findings as well as requirements set forth by the Department of Justice, the Monitoring Team as well as business requirements from the SPD, a custom developed solution appears to be the best solution, as a commercially off-the-shelf solution could address some of the requirements, but not all of the requirements.

To implement a high performance BI solution that meets all of the requirements, a two-stage plan is proposed for the SPD to be able to implement the proposed Future State solution.

Stage One: Engage an external vendor to focus on developing and implementing foundational processes around data management and governance as well as help SPD in validating and remediating existing data in systems that will be leveraged for the BI solution. Implement IT governance best-practices, such as the ITIL framework.

Stage Two: Once such foundational processes and governance controls have been put in place, work with an external vendor to design, development and implementation of the BI solution can commence.

It is critical that foundational gaps are addressed prior to the commencement of the development of the BI solution, as these affected data must be cleaned up prior to being used by the system as well as processes around data management and governance must be in place to prevent further issues with data and business processes that could impact the success of the BI solution.

The proposed Future State will provide the data entry, analytics, reporting and workflows needed to operate an effective Performance Management/Early Intervention System as required. Stage One is a pre-requisite and is estimated to be 6 months in duration. Once complete, Stage Two is estimated to be an additional 18-24 months. The proposed solution is estimated to cost $11.8 million.

2. Key Findings & Recommendations

2.1. Overview

This section will summarize findings and recommendations from the Current State Assessment, Gaps Analysis and Future State Summary documents.

2.1.1. Summary of Key Findings

Based on the analysis performed, a custom solution appears to be the most complete option available to SPD to best meet the requirements of a desired Performance Management/Early Intervention BI solution. While there are some commercially available options that meet some of the requirements, not all of the requirements can be met by such solutions.

The Current State assessment was performed to identify gaps that could pose possible barriers to the successful implementation of the BI solution. As a result of the Current State assessment, a number of key findings were identified. The key findings below are organized around Process, Technology and People:

Process: A number of process-related gaps were identified that impact SPD's overall readiness to implement a BI solution. These gaps can be categorized into the areas of 1) Data Quality, Availability and Reliability, 2) Data Management and Data Governance, 3) Quality, Reliability of Data Capture and Reporting and 4) IT Governance. Some of these gaps will be closed as a result of the implementation of a BI solution however, some of the gaps are more fundamental in nature and are considered to be foundational to the success of any IT organization and it is the recommendation of the Project team that they must be addressed prior to any BI solution.

Data Quality, Availability and Reliability: Consistency and availability of data for the solution is a challenge, as some business processes are manual, paper-based processes, some systems have incomplete data or out of date data while other data may be scattered across multiple, disparate systems. As an example, it is difficult to get consistent data from Street Checks as most of the data in the system resides as a narrative and currently there is no way to differentiate Terry Stops from other stops and detentions. In addition, there is no department wide view of training data because it exists in multiple systems, both electronic and paper based. While eLearning has closed gaps on providing training to officers, it does not provide the capability to handle qualifications. Inconsistencies have also been raised with HR data being out of sync and out of date between EV5, PEDS and Versonnel.

Processes around Data Management and Data Governance: There is a lack of data management and data governance practices within the department. This results in compounding issues with system integration and creates inconsistencies across systems resulting in lack of data, inconsistent data, inaccurate data or the same data in different formats. No processes were noted to regularly validate data in business applications and IT systems to ensure quality, availability and reliability. Some of the gaps listed under data quality above would have been preventable had robust data management and data governance processes been in place.

Quality, Reliability of Data Capture and Reporting Processes: Key business processes including Use of Force, OPA complaints, collisions, pursuits and lawsuits are manual and paper-based and as such are difficult to pull data from, report on, track and audit. Reporting is typically a manual and limited process. Combining data from different systems by hand limits its usefulness due to the availability and consistency of data. In addition, the current EIS process is a mostly manual process that is labor and time intensive, does not provide any early intervention capabilities and has limited usefulness. Furthermore, there are no processes in place to check and validate data.

IT Governance Processes: While IT governance practices were noted, the Project Team feels the processes such as change control, asset management, project management, and controls around the development environment are not robust enough as most are manual in nature, residing on sets of spreadsheets, or carried out through email exchanges.

Technology: There is a lack of technology wrapped around critical business processes and systems. As highlighted in the process findings, Use of Force, OPA complaints, officer involved collisions and pursuits as well as lawsuits have no electronic workflow and are paper-based, manual processes. As such, critical data essential for the BI solution is not readily available. While progress is being made on unifying applications under a common environment, there are still many systems for which there is little or no integration with key applications, resulting in application silos. There is also no unified reporting environment available; a number of reports are extracted from a variety of systems and then consolidated manually. Furthermore, there are a lack of systems in place to check on data to ensure reliability, availability and accuracy.

People: A significant gap exists around resourcing that must be addressed during the project. There are a number of roles missing from the IT organization that are needed to not only help in the implementation of the BI solution, but also support it moving forward. Although this may be mitigated though foundational gap closures, SPD currently has limited capacity to take on additional work without assistance. Some examples of key roles missing from the IT organization include Solutions Architects, Data Architects, Portfolio Managers and Business Analysts.

2.2. Gap Overview

The following table summarizes the gaps and risks highlighted in the Gaps Analysis document:

Gaps	Recommendation
1. Consistency and availability of data for the solution is a challenge, as some business processes are manual, paper-based processes, some systems have incomplete data or out of date data while other data may be scattered across multiple, disparate systems	• Automate manual, paper-based workflows to ensure data is captured timely, consistently and accurately, as well as enabling easy reporting and audit of the data • Update business processes to include checks against the data when inputted as well as having periodic reviews and re-certification of the data • Develop and employ data management and data governance processes to ensure data is managed consistently across the organization • Create a single data warehouse to simplify data availability • Audit, review and recertify data before bringing in to the proposed BI solution

Gaps	Recommendation
2. Due to the availability and consistency of data, reporting is typically a very manual process, combining data from different systems	• Automate manual, paper-based workflows to ensure data is captured timely, consistently and accurately, as well as enabling easy reporting and audit of the data • Update business processes to include checks against the data when inputted as well as having periodic reviews and re-certification of the data • Develop and employ data management and data governance processes to ensure data is managed consistently across the organization and that poor data is not generated • As a part of the BI solution, integrate key external data sources to consolidate data for easy reporting and analytics purposes • Audit, review and recertify data before bringing in to the proposed BI solution
3. For the scope of their work, their project portfolio and size of their environment, SPD IT would not be able to support the implementation of the end state solution without additional assistance	• Evaluate staffing levels as there are roles missing from SPD IT such as business analysts as well as gaps in support functions • Examine project portfolio and re-prioritize business projects to re-allocate resources need to support • Evaluate leveraging upcoming planned city-wide Shared Services model which could free up SPD IT resources to do other work
4. There is a lack of data management and data governance practices within the department which results in compounding issues with system integration for not only the end state solution but also impacts data consistency and availability	• Create standards for data management and governance such as creating an information taxonomy, data glossaries and metadata catalogs, establishing lineage of data • Establish processes to review and re-certify data by their owners on a regular basis to ensure data is clean, accurate and timely • Apply governance practices to current data and processes
5. The current EIS process is a mostly manual process which is very labor and time intensive and does not provide any early intervention capabilities	• Develop and deploy the proposed BI solution • Replace the current EIS process with the proposed solution • Certify data in current system before bring it in to the new solution
6. Key business processes such as Use of Force and OPA are completely manual and paper-based	• Automate manual, paper-based workflows to ensure data is captured timely, consistently and accurately, as well as enabling easy reporting and audit of the data • Update business processes to include checks against the data when inputted as well as having periodic reviews and re-certification of the data • Develop and employ data management and data governance processes to ensure data is managed consistently across the organization

Gaps	Recommendation
7. It is difficult to get consistent data from Street Checks as most data in the system resides as a narrative and there is currently no way to identify Terry stops (stops and detentions)	• Create an automated workflow for Terry stops to ensure data is captured timely, consistently and accurately, as well as enabling easy reporting and audit of the data • Update business processes to include checks against the data when inputted as well as having periodic reviews and re-certification of the data • Develop and employ data management and data governance processes to ensure data is managed consistently across the organization
8. There is no department wide view of training data. While eLearning has closed gaps on providing training to officers, it does not provide the capability to handle qualifications. In addition, training data exists in various systems both electronic and paper-based	• Leverage industry wide best practices by using an ETL tool to consolidate data from disparate systems in to a centralized data warehouse to simplify reporting and analytics

2.3. Summary of Data Availability

The following table will summarize the high level data gaps that need to be addressed as a part of the end state solution:

Theme	Gaps/Risks	Remediation
Usage of Force (UOF)	• Manual, paper-based process • Search of data is done by a person and is extremely time consuming • Difficult to generate reports and audit data	• Automate workflow as part of the suite of applications included with the solution • Deploy reporting, ad-hoc reporting and searches as a part of the solution • Create re-certification processes to ensure data is kept accurate and up to date over time
Terry Stops (Stops and Detentions)	• Street Checks captures stop data, however, it does not capture Terry stop data • Difficult to generate reports	• Create an application to capture Terry stops (stops and detentions) within the solution; application will have a complete workflow to process and record incidents • Create re-certification processes to ensure data is kept accurate and up to date over time

Theme	Gaps/Risks	Remediation
Performance Management Solution/Early Intervention System (PMS/EIS)	• Data in AIM is often not timely; it can take over a year to be entered in some cases • AIM does not capture all of the incident data; often the paper forms need to be referred to • Reporting is difficult and must be supplemented with data from other systems • Manual processes for areas such as lawsuits and secondary employment • Difficult to generate reports and audit data	• AIM will be replaced by the proposed BI system • Legacy AIM data will be imported in to the proposed BI system • Provide automated workflows for current paper processes • Create re-certification processes to ensure data is kept accurate and up to date over time
Training	• Training and qualification data reside across a number of systems and media such as eLearning, and Range • Difficult to generate reports and audit data	• Data from the disparate training systems will be imported in to the proposed solution via an ETL process which will validate, cleanse and transform the data before entering the BI data warehouse • Create re-certification processes to ensure data is kept accurate and up to date over time
Policies/Directives	• No major gaps found with eDirectives system	• Data from eDirectives will be imported in to the proposed solution via an ETL process which will validate, cleanse and transform the data before entering the BI data warehouse
Collision	• Manual, paper-based process • Search of data is done by a person and is extremely time consuming • Difficult to generate reports and audit data	• Automate workflow as part of the suite of applications included with the solution • Deploy reporting, ad-hoc reporting and searches as a part of the solution • Create re-certification processes to ensure data is kept accurate and up to date over time
Office of Professional Accountability (OPA) (Administrative Investigations)	• Manual, paper-based process • Search of data is done by a person and is extremely time consuming • Difficult to generate reports and audit data	• Automate workflow as part of the suite of applications included with the solution • Deploy reporting, ad-hoc reporting and searches as a part of the solution • Create re-certification processes to ensure data is kept accurate and up to date over time

Theme	Gaps/Risks	Remediation
Pursuits	• Manual, paper-based process • Search of data is done by a person and is extremely time consuming • Difficult to generate reports and audit data	• Automate workflow as part of the suite of applications included with the solution • Deploy reporting, ad-hoc reporting and searches as a part of the solution • Create re-certification processes to ensure data is kept accurate and up to date over time
Roster Management	• Personnel data spread across various systems such as EV5, Versonnel and PEDS • Data inconsistencies in each system • Systems are not in sync • Difficult to generate reports and audit data	• Proposed solution will do some checks against personnel data within the system • Data management and data governance practices developed as a part of the solution will help • Strengthen business processes to ensure onboarding/offboarding processes are completed consistency and accurately • Create re-certification processes to ensure data is kept accurate and up to date over time
Personalized and Targeted Awareness	• Lack of electronic means to check compliance • Reports for the most part are manually generated • No automated alerts when an officer exceeds thresholds	• The proposed solution will have personalized dashboards, a large inventory of reports, the ability to perform ad-hoc reporting as well as automated alerts

2.4. Recommendations

A high-performance BI solution provides advanced analytics, workflows, reporting, workflows and collaborative capabilities. For such a system to function correctly, the key factor is having useful, timely, consistent and accurate data available. In addition, data must come from many disparate systems where similar data can be interrelated to establish dependencies. This data needs to be reliably integrated in to a central repository for the BI solution to provide advanced analytics.

To be able to achieve this, source systems must have consistent data management practices as well as data governance practices, meaning that data must be managed in a consistent fashion across the enterprise. Governance around data would include processes to keep data up to date, periodic validation and cleansing as well as controls to make sure processes are consistently followed, therefore data can stay more consistent and accurate. These processes and controls around data management and data governance are critical to the success of the BI solution and are therefore considered to be foundational processes.

To achieve the end state goal of an operational Performance Management/Early Intervention System, the Project Team recommends a two-stage solution:

Stage One: Engage an external vendor to focus on developing and implementing foundational processes around data management and governance as well as help SPD in validating and remediating existing data in systems that will be leveraged for the BI solution.

Stage Two: Once such foundational processes and governance controls have been put in place, work with an external vendor to design, development and implementation of the BI solution can commence.

The Project Team believes that in order for SPD to have a higher probability of success with the implementation of a BI solution, these foundational gaps around how data is managed as well as governance processes must be addressed before the start of the implementation. Processes around proper end-to-end management of data as well as governance of the processes need to be developed and implemented immediately. If these are not done prior to the implementation of the BI solution, the risk of failure would be significantly higher. However, should these gaps be remediated, the Project Team does believe that SPD is capable of implementing, operating and supporting a BI solution.

It is important to note that establishment of the foundational processes will not close all of the gaps highlighted in this assessment. They should be viewed as pre-requisites that must be achieved prior to commencing the implementation of the BI solution. The foundational processes will provide the base for much of the design work around data and processes during the BI solution. The remaining gaps will be addressed through the implementation of the solution and its use. Such gaps include those related to key business processes currently based on manual, paper-based processes; these gaps will be closed as the solution will provide electronic workflows to replace the older manual processes.

2.4.1.1. Stage 1 - Addressing Foundational Gaps

The Project Team recommends engaging an external vendor or consultant to plan, design, and put in place foundational processes to address some of the high priority gaps and create the base on which the proposed BI solution will be built on such as:

- Develop and implement foundational processes to review and correct gaps in data in the source systems to the extent possible for consistency and cleanliness and certify current data to be imported once the proposed BI Solution is built. Data from source systems will be a significant part of the BI solution, thus accurate data is needed for a successful BI solution.

- Prior to the design phase, analyze and make recommendation on best of breed processes through which future data will be captured, validated, analyzed and staged prior to being populated in the data warehouse. While the interim solution, IApro will replace many of the manual processes, we expect SPD will need to re-engineer them to better fit their requirements for the Future State solution This will ensure a straight through and consistent data capture as close as to the source as possible. The key manual, paper-based processes that will be replaced by the BI solution include:

    - Use of Force/officer involved shootings
    - Administrative investigations/OPA complaints
    - Terry Stops (Stops and Detentions)
    - Officer involved traffic pursuits and collisions
    - Lawsuits

- The assessment also uncovered some deficiencies in IT governance processes. Some examples are processes through which project and portfolio management is carried out. The foundational processes will recommend strengthening IT governance processes based on industry-wide IT best practices, such as the ITIL framework. Having strong and robust IT governance practices will influence the SPD's ability to implement a successful BI solution as well as sustain it over time. The capacity to build these processes does not currently exist in SPD, as they require specialized skillsets that are not currently within the organization.

2.4.1.2. Stage 2 - Building the proposed BI Solution

The proposed BI solution will be the core solution used by SPD for Early Intervention and Performance Management. This will provide the core capabilities of streamlined data capture, validation, analysis, extraction, transformation & loading (ETL), data warehousing, advanced analytics, reporting and workflows.

Please refer to the Future State Summary document for details on the specifications and features of the Future State BI solution. The following recommendations should be implemented during the build of the proposed BI solution.

- As a part of the proposed solution, data from external sources will be normalized, cleansed and transformed prior to being placed in to the data warehouse in order to provide useful and accurate insights for data not collected by the suite of applications
- Decisions should be made by the SPD on which legacy data exiting on paper forms will be brought in to the new system

This proposed solution will be a complex and advanced state of the art solution built on the latest technology standards and a modern BI Platform. As mentioned prior, SPD IT does not have the capacity to support the implementation of the proposed BI solution, from not only a capacity standpoint, but the organization is also missing essential roles needed during the entire lifecycle of the project. As such, the Project Team recommends that SPD leverage an external vendor or consultant to build the BI solution. It is estimated that this will be a 18-24 month effort once Stage 1 is complete.

3. Target Future State

3.1. Overview

This section will give an overview of a possible solution that could be leveraged to provide a robust Performance Management/Early Intervention process via the proposed BI solution while also meeting the requirements of the Settlement Agreement, the Monitoring Team and the Department of Justice. The Future State High-Level Architecture developed at the end of the Future State Summary document is leveraged to provide a template for the solution.

This solution leverages an external developer to create a modern Performance Management/Early Intervention system complete with a suite of applications to manage cases including Use of Force/officer involved shootings, administrative investigations/OPA complaints, officer involved pursuits and collisions, Terry stops (stops and detentions) and lawsuits. The architecture of the solution will be as such that additional modules can be added in the future if needed and, as SPD needs change.

Data from the suite of applications will be stored in a centralized location and can be brought in to the data warehouse. Additional external data will be brought in from a variety of other sources, including training and qualification data, HR data, policy and directives data, call data, and street checks data.

A Performance Management/Early Intervention System backend component with business intelligence characteristics will handle all of the analytics within the system and provide outputs in the form of notifications, reports, ad-hoc reports and dashboard interfaces.

A number of pre-defined reports will be available to users, based on their role/access, as well as an extensive ad-hoc reporting ability including the ability to perform extensive peer-to-peer comparisons. A dashboard will be available for targeted awareness for a variety of users ranging from individuals who wish to know their vital statistics to command staff who can examine their organization at a glance and drill down to the individual level when needed.

The solution will also have an intervention management function to allow for the intervention workflow to be contained and tracked within the solution.

3.2. Beyond IApro as a Solution

Certainly one possible option would be to leave IApro as the final state solution as it meets many of the solution requirements and is also used by hundreds of law enforcement agencies in the United States and around the world. While IApro is a capable product and certainly does address many of the requirements, there are some missing features that make disqualify it as a possible final solution.

The following table illustrates what IApro can address against the requirements:

Area	Where IApro addresses requirements	Gaps in IApro against requirements
Case Management	• Use of Force • Complaints • Pursuits • Collisions • Firearm Discharges • Some support for custom incident types	
Supported External Data Sources	• Personnel data • RMS • Arrests/Booking • Sick leave/attendance • Discretionary charges	• Training • Qualifications • Missed court attendance • Commendations & awards • Policy/Directives
Others	• Analytics • Flexible thresholds • Pre-defined reporting • Ad-hoc reporting • Alerts • Basic dashboard	• Management of the intervention process • Advanced dashboard with personalized information and ability to drill down • Ability to have thresholds weighted based on unit, assignment and role (IApro allows for unit only)

As shown above, there are some significant gaps on between the requirements and what IApro can achieve, thus IApro is to be seen as an interim step towards a final solution.

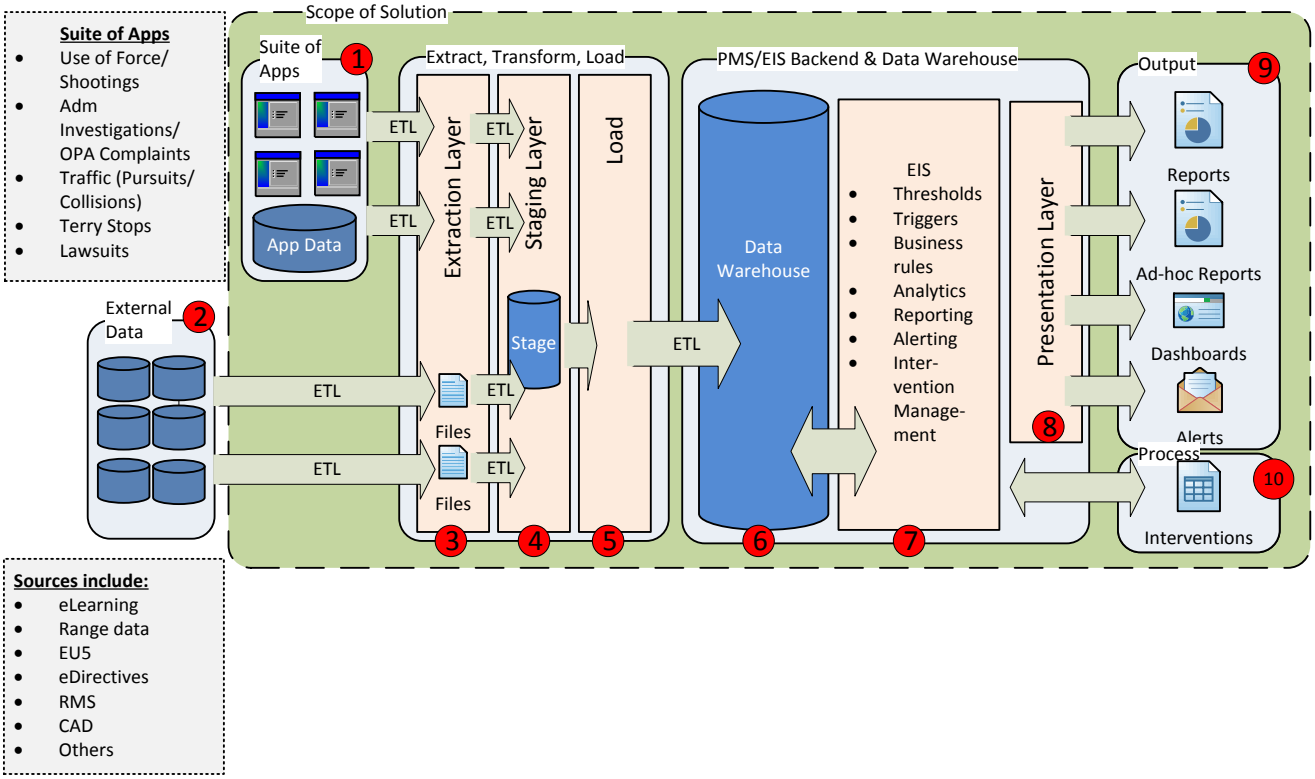
It should be noted that information about IApro was limited at the time of writing. The above is based on marketing material provided by CI Technologies; it does not represent the result of a hands on analysis with the product.

3.3. Other Solutions

During the course of the discussions with the Seattle Police Department IT and Compliance teams, other solutions such as a possible a vendor solution were discussed and work had been done to identify possible commercial solutions outside of IApro, however it was determined after discussions with the Monitoring Team that an off the shelf solution would not fulfill the requirements of the Settlement Agreement and have henceforth been removed from the scope of this exercise.

3.4. High Level Technical Landscape

The following diagram represents the High Level Technical Landscape for the solution including an explanation of each of the major components:



1 **Suite of Applications**: A suite of applications will provide data entry and workflows to replace current paper processes as well as streamline data entry, pushing data entry to the source, usually the officer or their supervisor for incidents such as Use of Force/office involved shootings, administrative investigations/ OPA complaints, pursuits, collisions, Terry stops (stops and detentions) and lawsuits.. Each application within the suite will leverage a common data store within the data warehouse used for BI purposes and role-based security architecture will ensure access to data is restricted only to authorized users.

Most applications will be user-facing data entry/business process workflow applications to collect, record and move incident data through chain of command approvals. A front-end application will also exist for OPA users to operate the PMS/EIS environment as well as set up thresholds, perform PMS/EIS reporting, manage OPA cases and interventions.

The suite of applications will be web-based and suitable for use both on desktop or mobile platforms. Additional modules can also be developed as requirements and business processes change.

2 **External Data Sources**: Much of the data required to augment the BI system is spread across a multitude of different applications and data repositories and is outside of the control of the Office of Professional Accountability. Required data from external resources will be brought in to the PMS/EIS data warehouse by way of the SPD enterprise bus solution, Sonic, or by other Extract, Transform, Load (ETL) techniques such as transferring database dumps, scripted SQL queries, CSV exports, etc.

As a part of the ETL process, data will need to go through several steps to put the data in to a format that can be used by the PMS/EIS data warehouse. Data from external resources will be loaded on a regular interval and validated before loading in to the data warehouse to ensure consistency and accuracy.

Sources of data include training & qualifications data, street checks data, personnel data, directives, policy and legal data as well as others such as call data, data on court appearances, sick days taken, secondary employment and more.

Much of the ETL functionality could be built in to the custom solution and adding/modifying and deleting of new data sources will be enabled from the management interface to provide a simple method to add additional data sources without having to re-code the application. Alternatively, a third part ETL tool could be used.

3 **Extraction Layer**: The extraction layer will take care of pulling required external data in to flat files and saving the results to a staging area. Each external data source will have its own set of extraction jobs to save to required data on regular intervals and only the required data to be passed on to the data warehouse would be extracted to reduce volumes.

4 **Transform Layer**: The transform layer will perform several operations on the data brought in to the staging area. Source data files will be loaded in to an intermediary database, checked against business rules for accuracy and consistency, cleansed and reformatted to fit a desired format before being loaded in to the data warehouse.

5 **Load Layer**: The load layer will perform the final loading of transformed data in to the data warehouse on a pre-defined interval from the intermediary database.

6 **Data Warehouse Backend**: The core of the solution is the data warehouse and PMS/EIS application back-end components. A database fitting within SPD standards would be used as the data warehouse component to simplify administrative and support. The PMS/EIS back-end component would be custom developed to meet SPD requirements.

The data warehouse is a centralized source of numbers pieces of data ranging from the data collected and processed by the front-end OPA suite of applications such as Use of Force, OPA complaints, Pursuits & Collisions and Terry stops applications. In addition, the data warehouse collects numerous other data points ranging from performance indicators to detailed data from external data sources, such as the SPD core Police applications, such as CAD, RMS, eLearning, eDirectives and other systems.

7 **Early Intervention System**: The PMS/EIS back-end application will handle all of the analytics, reporting and alerting functions as well as tracking and managing the intervention processes. Within the PMS/EIS back-end application, a number of thresholds and business rules will be defined. The PMS/EIS back-end application will periodically examine all of the indicator data looking for breaches to these thresholds.

All output services are also handled by the PMS/EIS back-end such as pre-defined reporting, ad-hoc reporting, alerts and dashboard portal.

All pre-defined reports will need to be defined and designed during the project design stage and would require significant input from the stakeholders.

8 **Presentation Layer**: The presentation layer will serve as the primary interface for reporting, ad-hoc reporting and dashboards to the system's users.

All access to PMS/EIS reporting and dashboard functions will be governed by role-based access. Supervisors will only be able to view data for those under their command. Command staff will have similar restrictions; they will only be able to see data for those under their command.

9 **Reports, Dashboards, Alerts**: Primary outputs from the PMS/EIS back-end application are in the form of pre-defined reports, ad-hoc reporting, system/email alerts and a personalized dashboard portal.

Pre-defined reports will be targeted to various audiences with an inventory of relevant reports. Ad-hoc reporting will also be available with the objective of Command and OPA staff to perform deep dives in to data to find new dynamics.

The dashboard portal will provide officers with a single location to look at a wide variety of key data related to them such as PMS/EIS performance indicators, outstanding training, recent training, qualifications inventory, qualifications up for expiry, number of complaints, lawsuits, Use of Force incidents, commendations, sick days and vacation days. Supervisors and Chain of Command staff will be able to see dashboards for their units, showing compliance over a number of indicators and the ability to drill down to the individual officer/employee level to see relevant details.

10 **Intervention Management**: Intervention case workflows can also be managed within the custom application, removing the need for a paper-based process. The intervention workflow is envisioned to have several stages including initiation, creation of a plan, Command review and approvals of the intervention plan, execution and tracking of the plan, post-plan follow-ups and completion. The precise plan workflow can be determined in more detail during the design stage of the project.

3.5. Application Future Disposition

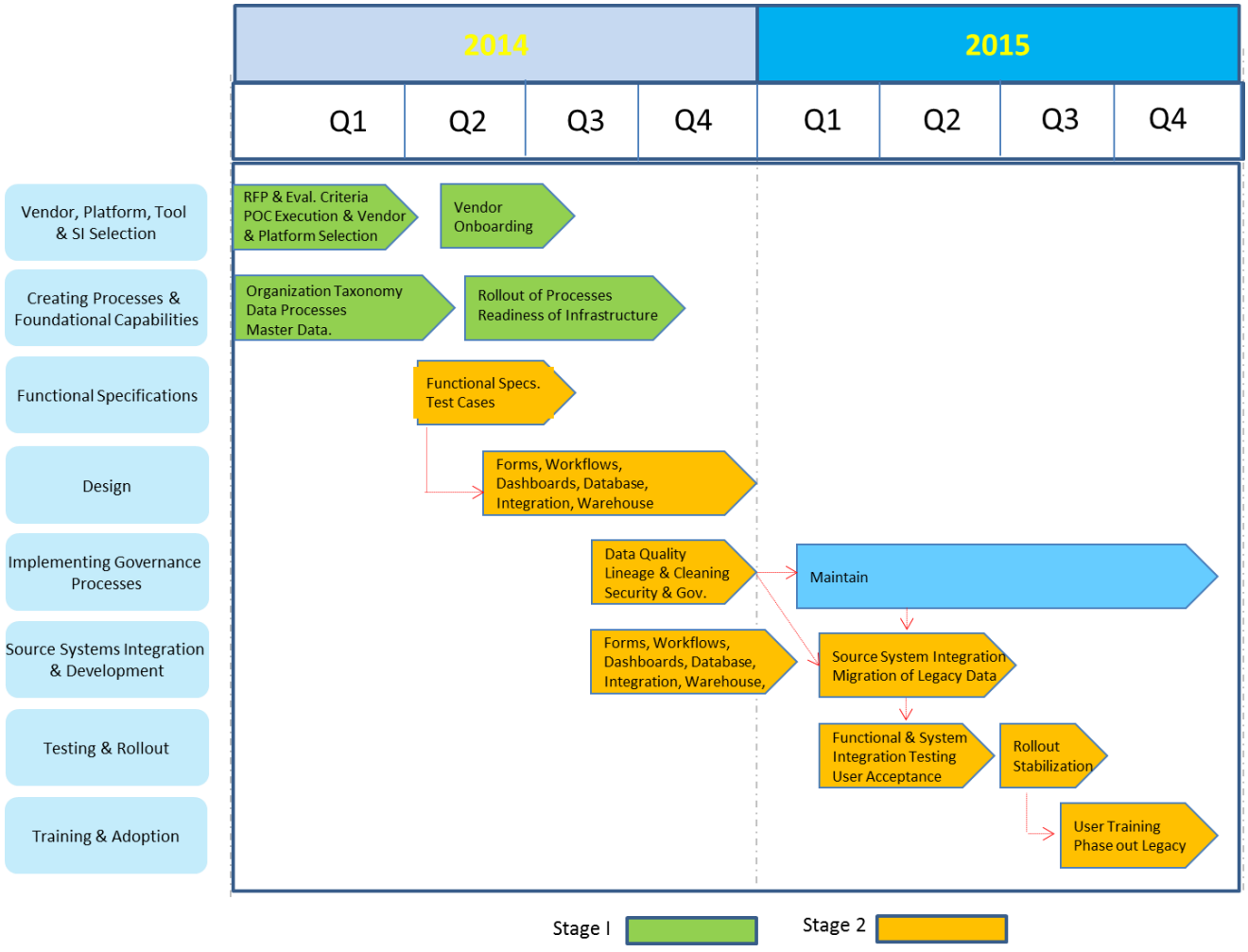
The following table summarizes the expected dispositions of affected SPD applications. These are currently estimates as actual decisions would be required during the design stage of the implementation project after work has been done on a more detailed design.

Application	Keep	Estimated Quality of Data	Actions
PEDS	Y	○	Examine data, clean as necessary, use as external data source
AIM-EIS	N	○	Legacy data will validated, cleansed and brought in to the solution
OPA	N/A	◐	Replace paper-based system with automated workflow
eLearning	Y	◐	Examine data, clean as necessary, use as external data source
eDirectives	Y	●	Examine data, clean as necessary, use as external data source
Versadex RMS	Y	◐	Examine data, clean as necessary, use as external data source
mySPD	N/A	N/A	System was never deployed
Reporting Data Warehouse (RDW)	Y	◐	Examine data, clean as necessary, use as external data source
Computer Aided Dispatch (CAD)	Y	●	Examine data, clean as necessary, use as external data source
Performance Appraisal System (PAS)	Y	●	Examine data, clean as necessary, use as external data source
Performance Mentoring (PMP)	N/A	N/A	System was never deployed
Admin eForms	N/A	N/A	System was never deployed
Versadex Versonnel	Y	○	Clean up data, ensure consistency with PEDS
Collision	N	◐	Replace paper-based system with automated workflow

Application	Keep	Estimated Quality of Data	Actions
InCar Video (ICV)	Y	●	TBD if data will be in final system
Digital Evidence Management (DEM)	Y	●	TBD if data will be in final system
Usage of Force (UOF)	N	◐	Replace paper-based system with automated workflow
Street Checks	TBD	◐	Implement Terry stops (stops and detentions) automated workflow to supplement Street Checks

3.6. Roadmap for the Future

The following diagram illustrates the anticipated roadmap for the custom solution including gap remediation and development of foundation processes necessary to support the solution, defining functional specifications with users, designing the solution, implementing the governance processes, systems development, testing and rollout.



3.7. Cost Estimates & Deployment Times

The following is a consolidated table of the estimated budget for the BI solution over a 24 month period:

Component	Cost
Stage 1	
Addressing Foundational Gaps[1]	**$768,000**
Data Consistency and Cleanup	
Creation of Data Management Processes	
Recommendation of IT Processes around ITIL Best Practices	
Recommendation of Project/Portfolio Management Processes	
Vendor and Platform Selection[2]	**$240,000**
Creation of RFPs with established specifications for Vendor and Platform Selection and creation of Evaluation Criteria	
Evaluation and shortlisting of Vendors	
Creation of POC Environment, Use Cases, POC Eval Criteria and Test Cases	
Assessment of POC, proposed Solution Blueprints and Roadmaps	
Final Assessment and selection of Vendor and Platform	
Stage 2	
Building the Performance Management/EIS Solution[3]	**$5,554,400**
Functional Specifications	
Design & Development	
Testing, Rollout and Training	
Hardware & Software Costs	***$2,909,600***
BI Solution Licenses	
ETL Tool Licenses	
Server OS & Server Hardware	
Other Software	
Backfill Resources[4]	**$2,400,000**
10 resources for 2 years to help execute gap remediation as well as execute the project and support the solution going forward	
Includes business analysis, architects, support engineers and a project manager	
TOTAL COST TO REMEDIATE GAPS AND IMPLEMENT SOLUTION	**$11,872,000**

Comments:

1. The costs associated would be to bring in a consultant team comprising of Project Manager, Enterprise Architect, Data Architect, BI Architect and Business Analysts working for six months is estimated to be able to achieve the recommendation and establishment of foundational processes. There would be requirements for support of this effort from the SPD side; these costs are addressed under Backfill Resources.

2. It is recommended for the selection process to be based on well-established evaluation criteria along with Proof of Concepts to determine the best-suited vendor.

3. This is estimated for the building of the complete solution from Functional Specifications to Rollout. It is important to note that this is a high-level estimation for budgetary purposes and assumes a higher-end solution. The actual cost might vary based on the platform and vendor selection and selection of features, architecture choices.

4. Backfill Resources are needed as SPD currently lacks the capacity to implement this endeavor without additional assistance. The Backfill Resources will be leveraged to support the creation of the foundational processes and the knowledge transfer back to

SPD, the build of the BI solution and the ongoing sustainment of the BI solution. The Backfill Resources are also required to help to address some of the other gaps that have been uncovered in IT governance and execution.

The below table summarizes estimated costs for maintaining the solution once implemented. These costs would begin after year 2.

Annual Support Cost	**$904,880**
ETL Tool Maintenance	
Server OS & Server Hardware Maintenance	
Other Software Maintenance	

NOTE: The above addresses vendor support for key components of the solution, such as the BI core components, the selected ETL tool, server operating systems maintenance as well as hardware maintenance. This cost does not include resourcing to support the daily operations of the solution. This would be addressed with the backfill resources.

3.1. Final Comments

As a result of the findings highlighted in the Current State assessment and Gaps Analysis documents as well as an examination of the requirements for the targeted Future State solution, the Seattle Police Department will need to invest substantially not only for the development of the Future State solution, but also closing the gaps found and strengthening and improving current processes. It is assumed in addition to processes, controls will also need to be strengthened and improved, however, they were not evaluated as a part of this exercise.

The questions of "is SPD ready to implement a BI solution" and "what needs to be fixed before the solution can move forward" have been raised to the Project Team. Through our analysis, while there are gaps today which need to be resolved prior to the solution moving forward, there are a number of gaps that will be fixed by the solution. As mentioned throughout the deliverables generated for this exercise, strong foundational processes are key pre-requisites. Some of the issues that have been uncovered regarding the quality, integrity and consistency of underlying data necessary for the BI solution need to be resolved. In addition, establishing strong practices to ensure future data is captured in a consistent, timely and in an accurate manner at the source with required checks and validation with minimized manual intervention will be critical to the success of the solution. As a result, it is recommended to conduct a review of business practices, the data they collect and how the data is verified should be performed before the solution is implemented. Implementing robust processes and governance will help address many of the data problems encountered.

Other gaps, such as many of the paper-based, manual process will be addressed with the implementation of the solution and having the department use the new automated workflows. As a part of the solution, data gathered via the automated workflows will address consistency, accuracy and timeliness issues faced today, as well as provide other capabilities such as detailed reporting and a verifiable audit trails.

In order to execute the solution, an enormous effort from not only the selected vendor, but also the SPD will be required. SPD IT, as it stands today, is unable to accommodate the additional work without some form of assistance. In addition, there will be demands on business users, compliance as well as key Command staff to be a part of the end-to-end effort, from planning and design stages to development and testing to release and use of the end state solution. This effort should not be underestimated and it is recommended that planning for this start as soon as possible.

Appendix A, Estimated Solution Costs

The following table summarizes the overall solution costs:

Summary

Component	Cost
Stage 1	
Addressing Foundational Gaps	**$ 768,000**
Data Consistency and Cleanup	
Creation of Data Management Processes	
Recommendation of IT Processes around ITIL Best Practices	
Recommendation of Project/Portfolio Management Processes	
Vendor & Platform Selection	**$ 240,000**
Creation of RFPs with established specifications for Vendor and Platform Selection and creation of Evaluation Criteria	
Evaluation and shortlisting of Vendors	
Creation of POC Environment, Use Cases, POC Eval Criteria and Test Cases	
Stage 2	
Building the Performance Management/EIS Solution	**$ 5,554,400**
Functional Specifications	
Design & Development	
Testing, Rollout and Training	
Hardware & Software Costs	**$ 2,909,600**
BI Solution Licenses	
ETL Tool Licenses	
Server OS & Server Hardware	
Other Software	
Backfill Resources	**$ 2,400,000**
10 resources for 2 years to help execute gap remediation as well as	
execute the project and support the solution going forward	
Includes business analysis, architects, support engineers	
and a project manager	
TOTAL COST TO REMEDIATE GAPS AND IMPLEMENT SOLUTION	**$ 11,872,000**
Annual Support Cost	**$ 904,880**
ETL Tool Maintenance	
Server OS & Server Hardware Maintenance	
Other Software Maintenance	

The following table provides a solution component development cost by application:

Module	Estimated Cost
Suite of Applications	**$ 2,028,040**
Use of Force	$ 405,608
OPA/Administrative Investigations	$ 347,664
Collisions	$ 115,888
Pursuits	$ 115,888
Terry Stops	$ 347,664
Lawsuits	$ 57,944
PMS/EIS	$ 637,384
BI Solution & Data Warehouse	**$ 1,738,320**
Reporting, Dashboards, Alerting	**$ 289,720**
External Data Source Integration	**$ 1,738,320**
TOTAL	**$ 5,794,400**

The following tables detail estimated resources for the effort:

Stage	Sub-stage	Internal/External	Role	Qty	Hourly Rate	Hrs/Month	Months	Man Months	Total
Stage 1	Vendor & Platform Selection	External	Eng. Lead	1	200	160	3	3	96000
Stage 1	Vendor & Platform Selection	External	Eng. Asso.	2	150	160	3	6	144000
Stage 1	Vendor & Platform Selection	SPD	Stakeholders	N/A	TBD	TBD	TBD	TBD	
Stage 1	Vendor & Platform Selection	SPD	Business Analyst	1	TBD	TBD	TBD	TBD	
Stage 1	Vendor & Platform Selection	SPD	Project Manager	1	TBD	TBD	TBD	TBD	
Stage 1	Vendor & Platform Selection	SPD	Application Architect	1	TBD	TBD	TBD	TBD	
Stage 1	Creation of Foundational Processes	External	Eng. Lead	1	200	160	6	6	192000
Stage 1	Creation of Foundational Processes	External	Eng. Asso.	4	150	160	6	24	576000
Stage 1	Creation of Foundational Processes	SPD	Stakeholders	N/A	TBD	TBD	TBD	TBD	
Stage 1	Creation of Foundational Processes	SPD	Business Analyst	1	TBD	TBD	TBD	TBD	
Stage 1	Creation of Foundational Processes	SPD	Project Manager	1	TBD	TBD	TBD	TBD	

Stage	Sub-stage	Internal/External	Role	Qty	Hourly Rate	Hrs/Month	Months	Man Months	Total
Stage 2	Functional Specifications	External	Business Analyst	1	130	160	3	3	62400
Stage 2	Functional Specifications	External	BI Architect	1	200	160	3	3	96000
Stage 2	Functional Specifications	External	Developer	2	150	160	3	6	144000
Stage 2	Functional Specifications	SPD	Stakeholders	N/A	TBD	TBD	TBD	TBD	
Stage 2	Functional Specifications	SPD	Business Analyst	2	TBD	TBD	TBD	TBD	
Stage 2	Functional Specifications	SPD	Project Manager	1	TBD	TBD	TBD	TBD	
Stage 2	Functional Specifications	SPD	Application Architect	1	TBD	TBD	TBD	TBD	
Stage 2	Solution Design – Forms	External	Business Analyst	2	125	160	3	6	120000
Stage 2	Solution Design – Forms	External	UX Designer	2	125	160	3	6	120000
Stage 2	Solution Design – Forms	SPD	Stakeholders	N/A	TBD	TBD	TBD	TBD	
Stage 2	Solution Design – Forms	SPD	Business Analyst	1	TBD	TBD	TBD	TBD	
Stage 2	Solution Design – Forms	SPD	Project Manager	1	TBD	TBD	TBD	TBD	
Stage 2	Solution Design – Forms	SPD	Application Architect	1	TBD	TBD	TBD	TBD	
Stage 2	Solution Design – Dashboards	External	Business Analyst	1	125	160	3	3	60000
Stage 2	Solution Design – Dashboards	SPD	Stakeholders	N/A	TBD	TBD	TBD	TBD	
Stage 2	Solution Design – Dashboards	SPD	Business Analyst	1	TBD	TBD	TBD	TBD	
Stage 2	Solution Design – Dashboards	SPD	Project Manager	1	TBD	TBD	TBD	TBD	
Stage 2	Solution Design – Database	External	Data Architects	2	200	160	5	10	320000
Stage 2	Solution Design – Database	External	Developer	2	150	160	5	10	240000
Stage 2	Solution Design – Database	SPD	Stakeholders	N/A	TBD	TBD	TBD	TBD	
Stage 2	Solution Design – Database	SPD	Business Analyst	1	TBD	TBD	TBD	TBD	
Stage 2	Solution Design – Database	SPD	Project Manager	1	TBD	TBD	TBD	TBD	
Stage 3	Solution Design – Database	SPD	Data Architects	1	TBD	TBD	TBD	TBD	
Stage 2	Solution Design – Integration Layer	External	Business Analyst	1	125	160	6	6	120000
Stage 2	Solution Design – Integration Layer	External	ETL Architect	2	200	160	6	12	384000
Stage 2	Solution Design – Integration Layer	SPD	Stakeholders	N/A	TBD	TBD	TBD	TBD	
Stage 2	Solution Design – Integration Layer	SPD	Business Analyst	1	TBD	TBD	TBD	TBD	
Stage 2	Solution Design – Integration Layer	SPD	Project Manager	1	TBD	TBD	TBD	TBD	
Stage 3	Solution Design – Integration Layer	SPD	Data Architects	2	TBD	TBD	TBD	TBD	
Stage 2	Solution Design – Data Warehouse	External	Data Architects	2	200	160	6	12	384000
Stage 2	Solution Design – Data Warehouse	External	Developer	2	75	160	6	12	144000
Stage 2	Solution Design – Data Warehouse	SPD	Stakeholders	N/A	TBD	TBD	TBD	TBD	
Stage 2	Solution Design – Data Warehouse	SPD	Business Analyst	1	TBD	TBD	TBD	TBD	
Stage 2	Solution Design – Data Warehouse	SPD	Project Manager	1	TBD	TBD	TBD	TBD	
Stage 3	Solution Design – Data Warehouse	SPD	Data Architects	2	TBD	TBD	TBD	TBD	
Stage 2	Solution Design – Reports	External	Business Analyst	2	125	160	4	8	160000
Stage 2	Solution Design – Reports	External	UX Designer	1	125	160	4	4	80000
Stage 2	Solution Design – Reports	External	Application Architect	1	200	160	4	4	128000
Stage 2	Solution Design – Reports	External	Data Architects	1	200	160	4	4	128000
Stage 2	Solution Design – Reports	SPD	Stakeholders	N/A	TBD	TBD	TBD	TBD	
Stage 2	Solution Design – Reports	SPD	Data Architects	1	TBD	TBD	TBD	TBD	
Stage 2	Solution Design – Reports	SPD	Project Manager	1	TBD	TBD	TBD	TBD	
Stage 2	Solution Design – Reports	SPD	Application Architect	1	TBD	TBD	TBD	TBD	
Stage 2	Solution Design – Business Logic, Business Rules, Component Design	External	Application Architect	2	200	160	4	8	256000
Stage 2	Solution Design – Business Logic, Business Rules, Component Design	External	Business Analyst	2	125	160	4	8	160000
Stage 2	Solution Design – Business Logic, Business Rules, Component Design	External	Developer	2	150	160	4	8	192000
Stage 2	Solution Design – Business Logic, Business Rules, Component Design	SPD	Stakeholders	N/A	TBD	TBD	TBD	TBD	
Stage 2	Solution Design – Business Logic, Business Rules, Component Design	SPD	Business Analyst	1	TBD	TBD	TBD	TBD	
Stage 2	Solution Design – Business Logic, Business Rules, Component Design	SPD	Project Manager	1	TBD	TBD	TBD	TBD	
Stage 2	Solution Design – Business Logic, Business Rules, Component Design	SPD	Developer	2	TBD	TBD	TBD	TBD	
Stage 2	Solution Design – Business Logic, Business Rules, Component Design	SPD	Architect	2	TBD	TBD	TBD	TBD	

Stage	Sub-stage	Internal/External	Role	Qty	Hourly Rate	Hrs/Month	Months	Man Months	Total
Stage 3	Solution Development	External	Architect	2	200	160	6	12	384000
Stage 3	Solution Development	External	Architect	1	200	160	3	3	96000
Stage 3	Solution Development	External	Developer	4	150	160	6	24	576000
Stage 3	Solution Development	External	Developer	3	150	160	3	9	216000
Stage 3	Solution Development	SPD	Stakeholders	N/A	TBD	TBD	TBD	TBD	
Stage 3	Solution Development	SPD	Business Analyst	1	TBD	TBD	TBD	TBD	
Stage 3	Solution Development	SPD	Project Manager	1	TBD	TBD	TBD	TBD	
Stage 3	Solution Development	SPD	Developer	2	TBD	TBD	TBD	TBD	
Stage 3	Solution Development	SPD	Application Architect	2	TBD	TBD	TBD	TBD	
Stage 3	Solution Development	SPD	Data Architects	2	TBD	TBD	TBD	TBD	
Stage 3	Solution Testing	External	Tester	3	125	160	6	18	360000
Stage 3	Solution Testing	External	Developer	2	150	160	6	12	288000
Stage 3	Solution Testing	SPD	Stakeholders	N/A	TBD	TBD	TBD	TBD	
Stage 3	Solution Testing	SPD	Business Analyst	1	TBD	TBD	TBD	TBD	
Stage 3	Solution Testing	SPD	Project Manager	1	TBD	TBD	TBD	TBD	
Stage 3	Solution Testing	SPD	Application Architect	1	TBD	TBD	TBD	TBD	
Stage 3	Solution Testing	SPD	Data Architects	1	TBD	TBD	TBD	TBD	
Stage 3	Solution Rollout	External	Developer	3	150	160	2	6	144000
Stage 3	Solution Rollout	External	Application Architect	2	150	160	2	4	96000
Stage 3	Solution Rollout	External	Data Architects	2	150	160	2	4	96000
Stage 3	Solution Rollout	SPD	Stakeholders	N/A	TBD	TBD	TBD	TBD	
Stage 3	Solution Rollout	SPD	Business Analyst	1	TBD	TBD	TBD	TBD	
Stage 3	Solution Rollout	SPD	Application Architect	1	TBD	TBD	TBD	TBD	
Stage 3	Solution Rollout	SPD	Developer	1	TBD	TBD	TBD	TBD	
Stage 3	Solution Rollout	SPD	Data Architects	1	TBD	TBD	TBD	TBD	
Stage 3	Solution Rollout	SPD	Project Manager	1	TBD	TBD	TBD	TBD	

The following table estimates the effort distribution for the proposed Backfill Resources:

Backfill Resource Effort Estimates

Proposed Resource	Role	QTY	% Effort on Foundational Gaps	% on Solution Implementation &	% on Other Gaps
Project manager	A project manager to run the project end to end as well as help SPD run other projects	1	20%	75%	5%
Business Analyst	SPD IT has no business analysts and they would be needed to help support the external party work with SPD	2	40%	30%	30%
Database Admin	Help address resourcing risks as current production support staff are spending their time executing projects	1	30%	40%	30%
Architects	SPD IT have no architects, can be used for both project support as well as furthering the development and use of standards within SPD IT	2	40%	60%	0%
Infrastructure Support	Help address resourcing risks as current production support staff are spending their time executing projects	4	15%	10%	75%
	TOTAL	**10**	**29%**	**43%**	**28%**